

### AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

#### Listing of Claims:

1. (Canceled)
2. (Currently Amended)      ~~The catalyst of claim 1, which is a supported catalyst in which  $\text{KMgPO}_4$  is supported on a carrier~~ A catalyst for hydrocarbon steam cracking, which comprises a supported  $\text{KMgPO}_4$  catalyst, wherein the  $\text{KMgPO}_4$  supported catalyst is obtained by supporting  $\text{KMgPO}_4$  on a carrier.
3. (Original)      The catalyst of claim 2, wherein the carrier is selected from the group consisting of alpha-alumina, silica, silica-alumina, zirconium oxide, magnesium oxide, magnesium aluminate, calcium aluminate, and zeolite.
4. (Original)      The catalyst of claim 2, wherein a content of  $\text{KMgPO}_4$  in the supported catalyst is in a range of 0.5-30 wt %, based on the total weight of the supported catalyst.
5. (Original)      The catalyst of claim 2, wherein  $\text{KMgPO}_4$  is derived from a  $\text{KMgPO}_4$  precursor prepared from magnesium nitrate hydrate, potassium hydroxide, and ammonium phosphate.
6. (Original)      A method for preparing a catalyst for hydrocarbon steam cracking, which comprises: dissolving a  $\text{KMgPO}_4$  precursor in water to prepare an aqueous solution of the  $\text{KMgPO}_4$  precursor; and impregnating a carrier with the aqueous solution of the  $\text{KMgPO}_4$  precursor to prepare a supported catalyst.
7. (Original)      The method of claim 6, further comprising sintering the supported catalyst.

8. (Original) The method of claim 7, wherein the sintering is carried out at 1,000-1,400°C for 22-26 hours.

9. (Original) The method of claim 6, wherein the  $\text{KMgPO}_4$  precursor is prepared from magnesium nitrate hydrate, potassium hydroxide, and ammonium phosphate.

10. (Original) The method of claim 6, wherein the carrier is selected from the group consisting of alpha-alumina, silica, silica-alumina, zirconium oxide, magnesium oxide, magnesium aluminate, calcium aluminate, and zeolite.

11. (Currently Amended) ~~The catalyst of claim 1, which is a sintered catalyst obtained by sintering a  $\text{KMgPO}_4$  powder or a  $\text{KMgPO}_4$  precursor powder and metal oxide~~  
A catalyst for hydrocarbon steam cracking, which comprises a sintered  $\text{KMgPO}_4$  catalyst, wherein the  $\text{KMgPO}_4$  sintered catalyst is obtained by sintering a  $\text{KMgPO}_4$  powder or a  $\text{KMgPO}_4$  precursor powder and a metal oxide.

12. (Original) The catalyst of claim 11, wherein a content of  $\text{KMgPO}_4$  in the sintered catalyst is in a range of 0.5-50 wt %, based on the total weight of the sintered catalyst.

13. (Original) The catalyst of claim 11, wherein the metal oxide is selected from the group consisting of alpha-alumina, silica, silica-alumina, zirconium oxide, magnesium oxide, magnesium aluminate, calcium aluminate, and zeolite.

14. (Original) The catalyst of claim 11, wherein the  $\text{KMgPO}_4$  precursor is prepared from magnesium nitrate hydrate, potassium hydroxide, and ammonium phosphate.

15. (Original) A method for preparing a catalyst for hydrocarbon steam cracking, which comprises:  
mixing a  $\text{KMgPO}_4$  powder or a  $\text{KMgPO}_4$  precursor powder and metal oxide; and

sintering the resultant mixture to obtain a sintered catalyst of  $\text{KMgPO}_4$ -metal oxide.

16. (Original) The method of claim 15, wherein the sintering is carried out at 1,000-1,400°C for 22-26 hours.

17. (Original) The method of claim 15, wherein the metal oxide is selected from the group consisting of alpha-alumina, silica, silica-alumina, zirconium oxide, magnesium oxide, magnesium aluminate, calcium aluminate, and zeolite.

18. (Currently Amended) A method for producing olefins by steam cracking of hydrocarbons in the presence of ~~the catalyst selected from the group consisting of a catalyst comprising  $\text{KMgSO}_4$  as a catalytic component, a supported catalyst and a sintered catalyst~~ the supported  $\text{KMgPO}_4$  defined in claim 2 or the sintered  $\text{KMgPO}_4$  defined in claim 11.

19. (Original) The method of claim 18, wherein the steam cracking is carried out at a reaction temperature of 600-1,000°C, a weight ratio of steam/hydrocarbons of 0.3-1.0, and LHSV (Liquid Hourly Space Velocity) of 1-20  $\text{hr}^{-1}$ .

20. (Original) The method of claim 18, wherein the steam cracking is carried out in a reactor selected from the group consisting of a fixed-bed reactor, a fluidized-bed reactor, and a mobile phase reactor.

21. (Original) The method of claim 18, wherein the catalyst is regenerated by removal of cokes formed on a surface of the catalyst at 500-1,300°C in the presence of air, steam, or a mixture thereof after the steam cracking.